

CLAIMS

What is claimed is:

1. A transistor, comprising:
a substrate;
a nitrogen-free polysilicon electrode contacting a portion of the substrate; and
a gate oxide disposed between the substrate and the nitrogen-free polysilicon electrode, the gate oxide including about 0.5% nitrogen by atomic weight at an interface with the substrate, the nitrogen progressively increasing to comprise between 2.5% and 10.0% nitrogen by atomic weight at an interface with the nitrogen-free polysilicon electrode, the gate oxide hardened using a remote plasma-based nitrogen hardening treatment and annealed thereafter.
2. The transistor of claim 1, wherein the nitrogen-free polysilicon electrode having the bottom surface comprises a P-type dopant.
3. The transistor of claim 2, wherein the P-type dopant is boron.
4. A surface P-channel transistor, comprising:
a substrate;
a nitrogen-free polysilicon electrode contacting a portion of the substrate, the electrode comprising a P-type dopant including boron; and
a gate oxide disposed between the substrate and the nitrogen-free polysilicon electrode, the gate oxide including about 0.5% nitrogen by atomic weight at an interface with the substrate, the nitrogen progressively increasing to comprise between 2.5% and 10.0% nitrogen by atomic weight at an interface with the nitrogen-free polysilicon electrode, the gate oxide hardened using a remote plasma-based nitrogen hardening treatment and annealed thereafter.

5. The surface P-channel transistor of claim 1, wherein the gate oxide comprises a hardened gate oxide using a remote plasma-based nitrogen hardening treatment using a high density plasma process for approximately 60°C for about 10 seconds using about 1500 watts of power.

6. The surface P-channel transistor of claim 1, wherein the gate oxide comprises hardening the gate oxide using a thermal remote plasma-based nitrogen hardening treatment process at approximately 750°C for about 2 minutes.

7. The surface P-channel transistor of claim 1, wherein the gate oxide comprises a hardened gate oxide annealed at approximately 800°C for approximately 60 seconds.